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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729.834	12/05/2003	Gary R. Holt	10006.001710	8546
31894	7590	01/18/2008		
OKAMOTO & BENEDICTO, LLP P.O. BOX 641330 SAN JOSE, CA 95164			EXAMINER WERNER, DAVID N	
			ART UNIT 2621	PAPER NUMBER
			MAIL DATE 01/18/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/729,834	Applicant(s) HOLT ET AL.	
	Examiner David N. Werner	Art Unit 2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-6 and 8-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-6 and 8-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action for US Patent Application 10/729,834 is in response to communications filed 17 December 2007, in reply to the interview of 06 December 2007. Currently, claims 2-6 and 8-12 are pending.

2. In the prior Office action, claims 2-4, 6, and 8-11 were rejected under 35 U.S.C. 103(a) as obvious over "Motion Compensated Enhancement of Noisy Image Sequences" (Kalivas et al.) in view of US Patent 5,646,691 A (Yokoyama), and in view of European Patent Application Publication 1,100,260 A1 (Borneo et al.). Claims 5 and 12 were rejected under 35 U.S.C. 103(a) as obvious over Kalivas et al., in view of Yokoyama and in view of Borneo et al., and in further view of US Patent 5,544,239 A (Golin et al.).

Response to Arguments

3. Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground(s) of rejection. Applicant argues that Yokoyama does not teach the claimed limitation of "determining segments that are no longer adjacent to a segment boundary". As discussed in the interview of 06 December 2007, this argument is persuasive. See Interview Summary (PTOL-413) of 11 December 2007. However, it is respectfully submitted that International Publication 00/64167 A1 (Prakash et al.), previously introduced into the record by the Applicant, teaches the disputed claimed subject matter.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2-4, 6, and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over "Motion Compensated Enhancement of Noisy Image Sequences" (Kalivas et al.) in view of International Publication 00/64167 A1 (Prakash et al.), admitted as prior art in page 7: line 34–page 8: line 12 of the specification of the present invention, and cited in the Information Disclosure Statement of 18 June 2004. Kalivas et al. teaches a noise compensation algorithm that reduces the effect of motion blur. Regarding claims 2, 6, and 8, equation 15 of Kalivas et al. gives motion compensated spatiotemporal filter, and equation 16 gives a spatiotemporal mean filter. Regarding the "object motion estimation for arbitrarily shaped segments" to align pixels, between a frame at time k and at time $k+1$, the motion of an object pixel is given according to a linear model (§ 2.2). A frame is segmented according to object indicator function λ , where for a given pixel (i, j) at frame k , $\lambda(i, j, k)$ is set to 1 if the pixel is in the object, and 0 if not (§ 2.1). Then, object indicator function λ serves as a weighting function. The segmentation model can be modified for multiple objects (equation 3). Regarding the "weighted average", in the spatiotemporal mean filter, the average of pixel values $g(l, m, n)$ is then taken over region L in space-time window (W_{ni}, W_{nj}, T) , centered on point $(i_n,$

j_n) at time k . L is only counted in the region in which for a certain object, $\lambda(l, m, n)$ is defined (§ 4.2). This reduces the blur between the boundaries of the various objects (abstract). However, Kalivas et al. does not take into account boundary regions.

Prakash et al. teaches a video motion encoder and decoder. Figure 2 shows the method performed by the encoder, and figure 4 shows the method performed by the decoder. Regarding claims 2, 6, and 8, in the encoder of Prakash et al., at step 204, block 104 segments an image into various regions from a method known in the art (pg. 8: lines 27-32). At step 206, block 106 receives a second image frame, and at step 207, the second image is segmented (column 9: lines 7-13). At step 208, block 108 encodes the motion between the two images (column 9: lines 14-15). This corresponds with the claimed "object motion estimation". At step 209, as determined from the motion from step 208, newly-exposed regions are discovered (column 9: lines 16-18) and encoded. This corresponds with the claimed "determining segments that are no longer adjacent to a segment boundary based on said motion estimation", since determining newly-exposed regions is performed by determining a difference in segmentation between the two frames (pg. 14: lines 30-34) and determining the predicted image with the actual image at the new regions (pg. 19: lines 7-25), thus determining the difference from new segments and previous segments, near the boundaries of the segments (column 23: lines 28-32). This appears substantially similar to the determination of pixels "no longer immediately adjacent" to a boundary segment in the present invention from determining exposed areas (specification: pg.8: lines 17-25; pg. 13: line 23).

Kalivas et al. teaches a majority of the claimed invention except for determining newly-exposed regions according to changed segmentation of an image. Prakash et al. teaches that it was known at the time of the invention to calculate exposed regions of an image, and perform special coding on the exposed regions. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the filter of Kalivas et al. to decrease the weight of exposed regions of an image, as taught by Prakash et al., since Prakash et al. states in page 4: lines 14-17 that such a modification would reduce noise produced from residue between frames.

Regarding claim 3, in Kalivas et al., in any exposed area in a given frame, that is, an area outside an object, weight λ is zero (§ 2.1), and so will not be counted in a temporal filter (§ 4.1).

Regarding claims 4 and 11, Kalivas et al. and Prakash et al. are silent regarding Group of Picture (GOP) structure. However, the examiner takes Official Notice that the limitation of "determining additional motion information across GOP boundaries" is a well-known part of the MPEG standard. A GOP for which motion estimation can be taken across GOP boundaries is well-known in the art as an "open GOP". It would have been obvious for one having ordinary skill in the art at the time the invention was made to include a filter on a video stream having open GOPs, since open GOPs allow for reduced bandwidth in an encoded image sequence.

Regarding claims 9 and 10, Prakash et al. determines residue areas of an image both from "background residue" (pg. 19: lines 16-29; pg. 19: lines 8-24), corresponding with the "blur region near an exposed area" in claim 9, as well as from "local residue"

from other discrepancies in segment matching (pg. 9: line 30–pg. 11: line 8; pg. 19: line 27–pg. 20: line 10), which encompasses the claimed “blur region between converging objects” in claim 10.

6. Claims 5 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kalivas et al. in view of Prakash et al. as applied to claims 1 and 8 above, and further in view of US Patent 5,544,239 A (Golin et al.). The above-cited art do not teach adjusting a temporal filter based on a lighting offset.

Golin et al. teaches a motion estimation method that compensates for a fading image. Regarding claims 5 and 12, Figure 1 of Golin et al. shows brightness adjustment unit 104, which calculates base image 106 by reducing pixels in an image by the average pixel brightness in the image and in the next image (column 2: lines 43-53). This is in response to fade detector 101, which stores the frame in a buffer if a sequence is fading (column 2: lines 25-42). Motion analysis unit 108 then determines displacement vectors between the current image and the previous base image (column 3: lines 16-15).

Kalivas, in combination with Prakash, discloses the claimed invention except for calculating a lighting offset. Golin et al. teaches that it was known to calculate motion analysis in an image sequence based on images with adjusted brightness. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to add a brightness adjustment unit to a motion analysis system as taught by Golin et al., since Golin et al. states in column 1, lines 41-55 that such a modification would increase accuracy of motion estimation.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patent 6,064,776 A (Kikuchi et al.) teaches an image processing apparatus that divides an images into several regions, and reduces distortion between noisy regions of an image according to a weighting function. Japanese Patent Application Publication 62-091090 A (Mochizuki) teaches a video encoder/decoder that reduces errors at block boundaries.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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DNW

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TC 2600